

Ichthyoplankton of the Egyptian Mediterranean waters.
VI- Distribution and abundance of Pilchard larvae.

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The occurrence and seasonal abundance of the pilchard larvae *Sardina pilchardus* (Walb.) in the southeastern Mediterranean waters off the Egyptian coast between El-Agami (long. 29° 45'E) and El-Arish (long. 33° 45'E) (Fig. 1), were studied from ichthyoplankton samples collected seasonally during the period from December 1981 to October 1984. The sampling methods and stations sampled are described in EL-RASHIDY & DOWIDAR (1990)

Results and Discussion.

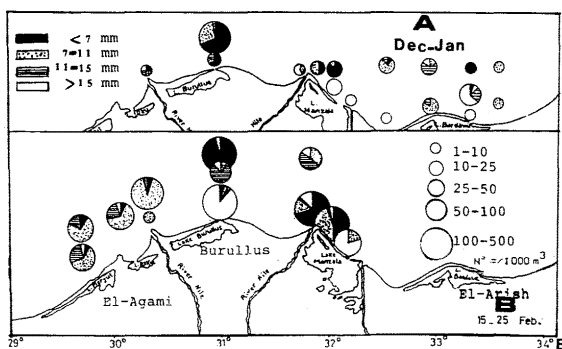
A total of 808 pilchard larvae ranging in size from 3 mm to 25 mm, were recorded in 127 ichthyoplankton samples collected from 93 stations in the study area during the period from autumn to spring.

Pilchard larvae first appeared in the plankton in late November when one specimen, 12 mm long, was recorded on 28 November in the middle zone (depth 55 m) indicating the beginning of the spawning season.

The spawning activity of the species increased progressively during the winter months, in late December-early January. The larvae were widely scattered in the inshore zone from Rosetta to El-Arish (fig. 1), and ranged in length from 3 to 21 mm, the greatest density was found in the middle zone which harbored 74% of the larvae fished during this cruise, most of them (63%) were of smaller size (< 11 mm) (Table 1).

The spawning activity of *S. pilchardus* in the area, reached its peak in February, when 75% of the total larvae fished were recorded from 80% of the stations sampled, ranging in length between 3 mm and 25 mm (Table 1). The water temperature during this month reached its annual minimum (16-18°C) and conditions of homothermal and homohaline water column exists. Most of the larvae, i.e. 67%, occurred in the inshore zone (Table 1).

In April (15-26 IV), the larvae were scarce, 7 specimens (with length range 13-23 mm), were irregularly dispersed in the inshore and middle zone. The absence of smaller larvae probably reflects the low spawning activity in late March and end of spawning season in April.



Unfortunately, data on the reproductive biology of pilchard in our waters are completely lacking. However, as in other Mediterranean regions, the present results showed that this species is a true winter spawner. The breeding season extends from mid-November to April with the peak in February. The observed breeding temperature ranged from 16°C to 21.5°C and the salinity range 37.6-39.7%. These results corroborate those given for this species in other Mediterranean regions, where the reported breeding temperature ranges between 8 and 23°C and salinity 23-38.8%; the temperature range of the adult fish 8 to 28°C (DEMIR and DEMIR, 1961; ZAVODNIK, 1970).

As to the spawning grounds, it is generally believed that the species breeds in deeper waters, 40-90 m (FISHER, 1973; YANNOPOULOS and YANNOPOULOS, 1979). In the Egyptian Mediterranean waters, newly hatched larvae occur in both inshore (20-30 m depth) and middle-offshore (50-150 m) zones (fig 1). CIHANGIR (1990) reported that hatching of Pilchard larvae require 2-3 days at 16-19°C. It is thus obvious that spawning of the species occur in both inshore and middle offshore zones. Whether this pattern reflects the presence of two stocks of adult fish, a local endemic stock spawning in the inshore zone, and a migratory stock invading the area in early winter for spawning and feeding could not be revealed with certainty from the present results.

Whether the fish spawn in surface or subsurface waters is not easy to clarify from available data. However, during the December cruise, about 50% of the pilchard larvae caught occurred in subsurface waters (20-25 m) most of them were of smaller size (3-7 mm) indicating that spawning may occur in subsurface layers (DEMIR and DEMIR, 1961).

Table 1 : Percentage occurrence of the different size groups of Pilchard larvae in the study area (based on the actual numbers in each sample).

Cruise	Zone	3.1-7 mm	7.1-11 mm	11.1-15 mm	15.1-19 mm	> 19 mm	Total
		%	%	%	%	%	
Dec-Jan. (22/12/81- 4/1/82)	Inshore	5.3	5.3	2.4	2.8	4.3	20.1
	Middle	40.7	22.0	3.8	6.2	0.96	73.7
	Offshore	0.5	1.4	3.3	0.96	NR	6.2
February (15-25/2/84)	Inshore	23.3	14.2	1.0	16.6	11.7	66.8
	Middle	0.7	13.4	5.6	0.7	NR	20.3
	Offshore	6.9	3.9	1.7	0.34	NR	12.9
April (15-26/4/82)	Inshore	NR	NR	14.3	NR	42.8	57.1
	Middle	NR	NR	--	42.8	NR	42.8
	Offshore	--	--	--	--	--	--

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